

Planning the Kansas High Accuracy Reference Network (HARN)

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Background

The National Geodetic Survey (NGS) has developed a set of strategic goals that include among others, (1) the establishment of a Federal Base Network (FBN); a set of high accuracy geodetic control stations at roughly 100 km spacing, (2) providing assistance, coordination, and support in establishing a Cooperative Base Network (CBN) which densifies the FBN at 25-50 km spacing, and (3) the establishment of high accuracy geodetic control at selected airports in support of the Federal Aviation Administration (FAA) and the airline industry, thereby helping to sustain the air transportation infrastructure.

In accordance with these strategic goals, NGS, in cooperation with the Kansas Society of Land Surveyors (KSLS), plans to perform a HARN survey beginning in May 1997.

HARN surveys have been an ongoing high-priority activity at NGS since 1988, even before the current NGS strategic plan was fully developed. Typically, HARN surveys have been accomplished on a state-by-state basis with NGS performing the survey in cooperation with the lead surveying organization(s) in the state. By the end of January 1997, NGS field crews and cooperating organizations will have completed HARN surveys in 45 states. The HARN surveys in the remaining five states are expected to be completed in 1997.

Project Definition

The Kansas HARN will be defined by the requirements and resources of NGS, KSLS, and any other surveying organizations that become involved. The following paragraphs list the Kansas HARN requirements to date.

In order to satisfy FBN requirements, NGS will usually perform an A-order survey first. The A-order survey establishes stations at roughly 300 km spacing and is designed to achieve one part in 10,000,000 horizontal accuracy, and requires 3 days of observations at each site. In Kansas there are already four monumented A-order stations, as well as four A-order Continuously Operating Reference Stations (CORS). Therefore, an A-order survey is not required.

NGS plans to establish a 1 x 1 degree HARN in Kansas as part of the nationwide HARN. This will require a GPS survey of approximately forty (40) B-order stations. The B-order survey will include the establishment of HARN stations at approximately 17 airports, to partially satisfy the FAA requirement. These particular HARN stations are also labeled Primary Airport Control

Stations (PACS) by FAA. NGS will also perform observations, simultaneously with the HARN stations, at existing HARN stations in adjacent states in order to maintain consistency across state borders. KSLS is presently soliciting support from other surveying organizations in the state for extending the HARN.

Things to Do

The first order of business is to draft a Cooperative Agreement. In some past agreements, NGS was willing to perform the entire HARN survey and be reimbursed for anything beyond the Federal responsibility. However, NGS no longer has the personnel to devote to a 25-50 km spacing survey without having the cooperation of other organizations supplying both GPS receivers and people to operate them. The agreement will therefore be one in which there is no exchange of money; instead, various organizations in Kansas would agree to work with NGS in performing the survey. NGS will be working closely with KSLS in the near future in drafting the agreement. Surveying organizations that wish to participate in the Kansas HARN survey should contact:

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The Cooperative Agreement could include a provision for a workshop to instruct participants in topics related to the HARN survey. (This provision would require reimbursement to NGS for the instructor's travel and per diem.) Topics could include reconnaissance and mark setting, observing procedures, data reduction and adjustment, and maintenance of the HARN. Such a workshop would be given sometime after the agreement is signed and before the field observations begin.